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Citizens' Bulletin

This is
your land

Wildlife Week
March 20-26

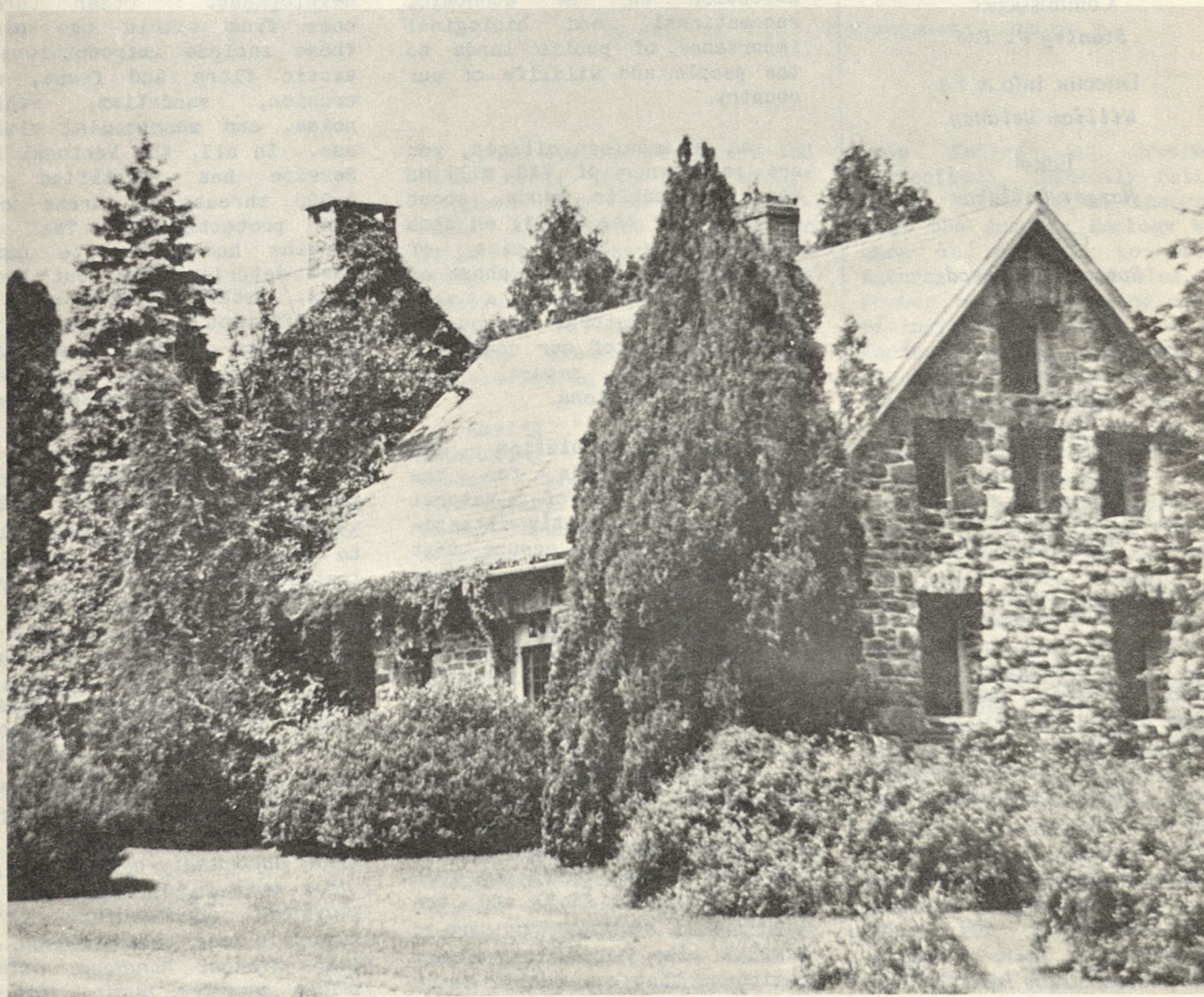
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Contents

- 2 This is your land
- 3 Trailside Botanist
- 6 Fire towers
- 10 Aerial observation
- 12 Elms
- 15 Improving coastal embayments
- 16 Amphibians lead double lives
- 19 FYI - Land use - Legislature
- 21 Rainfall summary

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THIS IS YOUR LAND

Wildlife Week: March 20-26, 1983

Ever since 1938, the first week of spring has also been National Wildlife Week. From March 20 to 26, 1983, the National Wildlife Federation and state affiliates such as the Connecticut Wildlife Federation will be sponsoring the 46th observance of National Wildlife Week.

The 1983 theme is "THIS IS YOUR LAND--Public Lands Belong to All of Us." The Wildlife Federation's aim is to focus attention on the economic, recreational, and biological importance of public lands to the people and wildlife of our country.

As an American citizen, you are part-owner of 740 million acres of public lands (about one-third of the U.S.A, an area approximately the size of India). This treasure chest of land is filled with a vast wealth of natural resources including many of our country's most famous natural and historic attractions.

Growing population and increasing demands for the finite supply of natural resources have greatly intensified the need to ensure that our public lands are effectively managed. The responsibility of balancing the needs of humans and wildlife on public lands belongs to all Americans.

In 1983 for the third time the Wildlife Federation is emphasizing that public lands are important to the citizens and wildlife of our nation. The 1949 theme, "THIS IS YOUR LAND, CONSERVE IT," and the 1958 theme, "PROTECT OUR PUBLIC LANDS," also served as timely reminders that our public lands are some of our nation's greatest treasures.

Today, in some areas, the resources held in trust within America's national parks, long thought to be safeguarded for future generations, are threatened by developments inside and outside the parks. Yellowstone, for example, the first national park, is threatened by geothermal drilling proposed just outside the park boundaries. This kind of drilling has already damaged seven out of ten of the world's premier geyser basins.

A formidable list of other threats are contributing to the deterioration of the parks. Over half of these arise outside park boundaries in the form of air and water pollution, oil and gas exploration, mining, timber cutting, industrialization, construction of vacation homes, and urban development. Other threats come from within the parks. These include introductions of exotic flora and fauna, soil erosion, vandalism, vehicle noise, and mushrooming visitor use. In all, the National Park Service has identified over 4,000 threats to areas under its protection. The park service has plans to combat park deterioration, but budget cuts, staff shortages, and insufficient numbers of scientists and specialists strain the park service's ability to implement these plans.

Today the federal government has also proposed selling 35 million acres of public land to private owners. This land transfer is supposed to bring in 17 billion dollars over the next five years and will be part of the strategy to reduce the national debt. Parcels of public land currently administered by government agencies

To page 22

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Trailside Botanist studies plant life, quality of life at Greenwich Audubon

By Kirsten Engel, Environmental Intern

"Just come on over here and shake hands with this tree," beckoned "Win" Carter. Dutifully I extended a hand in neighborly greeting only to be stung by the prickly bark of a Hercules club tree. "Ouch!" (Needless to say, this member of the ginseng family has trouble making friends.)

Having captured my attention, naturalist and author Carter gave me a mini-botany lesson. "Each of these 'branches' you see is actually a single leaf -- they look like branches because they're twice compound," he said. "When they fall off in autumn they leave only a straight spiny pole." Carter, unable to suppress a chuckle as I opened and shut my bruised palm, remarked, "I guess you can see why it was called 'devil's walking stick.'"

So began a fascinating and delightful afternoon with G. Winston Carter, author of the column "Trailside Botanizing" which is featured each month in the "Citizens' Bulletin," and other staff members at the National Audubon Society Aud-

ubon Center in Greenwich, Connecticut. Recently retired, Carter works as an instructor with the Audubon Ecology Workshop in addition to writing natural history articles. A former high school and college biology and botany teacher, Carter's way of unfolding botanical mysteries has won him fans among students and workshop participants as well as "Bulletin" readers. "At first people in the workshop find him hard to get to know," said Phil Schaeffer, Director of the Audubon Center, "but by the end of the week, sure enough, he's their favorite instructor."

Born in Colebrook, a small town in Northern New Hampshire, Carter has had a lifelong familiarity with the natural environment. Following his graduation from Plymouth State College in New Hampshire, with a major in English and social studies, Carter decided to become fully certified to teach biology and general sciences as well. He taught biology and social studies in several New Hampshire towns and more recently taught biology at Bristol Eastern High School and



Kirsten Engel

"Bulletin" columnist G. Winston Carter does some actual "trailside botanizing" at Audubon Center in Greenwich.

botany at nearby Tunxis Community College. In 1965 he took a year's leave of absence and earned his M.S. degree in Resource Planning and Conservation from the University of Michigan.

Carter first became an instructor at the Audubon Ecology Workshop in Greenwich in 1963. At this time it was called the Audubon Camp of Connecticut. He has worked there for 15 summers since then. This work has provided him with the opportunity to teach, be outdoors, and complete the necessary research for his "Citizens' Bulletin" column. This and the use of numerous sources supplements his own knowledge, enabling Carter to provide as accurate a

picture as possible of each plant he writes about.

Carter first became involved with the Audubon Society as a participant at the Society's camp in Maine in 1946. Here he was taught by such outstanding naturalists as Dr. Carl Buchheister (later, president of the Audubon Society), Dr. Donald Borror, Allen Cruikshank, and Farida Wiley. This experience aroused Carter's enthusiasm so much that he attended the Audubon Camp of Connecticut the following year. He recalled that he lived in Mead House with six or eight people sharing each room. Carter laughs, "I remember coming late and having to take the top bunk." The camp could only accommodate 20 peo-

ple at that time. Since then, a lodge has been built which accommodates 34.

Despite the close quarters of his first experience at Greenwich, Carter eagerly accepted an offer of an instructor's position there in 1963. He has never regretted it. Carter began teaching botany along with Leonard Bradley, one of Connecticut's finest field botanists. "It was wonderful working with him," says Carter. "I knew if I had any questions I had an expert right there to answer them."

The Connecticut Workshop in Greenwich is one of four similar programs located in different terrains and habitats across the country. The first Audubon Camp, established in 1936, is located on the 333 acre Todd Wildlife Sanctuary on Hog Island, Maine. The remaining two are in Wisconsin and Wyoming.

The Connecticut Workshop offers the most extensive curriculum of the four programs, eight courses in all, starting in late June and lasting through the end of August. The Connecticut workshop is also the only program that operates out of an Audubon Center, which perhaps explains its ability to offer a full load of courses during the summer months.

Under the directorship of Phil Schaeffer, the independent Ecology Workshop was incorporated into the Center's regular education program to maximize the use of staff expertise and the Greenwich Center's interpretive facilities.

The Workshop's introduction to field ecology, its most popular course, is a comprehensive mini-ecology, biology, zoology, botany course designed to provide the participant with an opportunity to study firsthand the major natural habitats which typify the southern New England landscape. This includes meadows, deciduous forests, hemlock forests, and fresh water and salt water communities.

Participants take nature hikes and receive classroom instruction during the day and are treated to slide and lecture programs during the evening. The group may break up to study their choices of geology, wildflowers, nature photography, and insects, or may stick together to explore the chemistry of a meandering stream or a meadow. At the end of the week the group is treated to a trip to the seashore where they examine the ecosystem formed by salt marshes, tide pools, and algae. The trip is more than a natural history outing, however. "While we're there we try to discuss the pros and cons of different coastal protection schemes," said Carter.

In addition to the introductory field ecology course, the Workshop offers an Alumni Field Ecology course for either the graduates of the introductory course or persons with more advanced ecology backgrounds. "The alumni course includes basically the same topics as the introductory course, but it goes into much greater depth," explained Carter. "When we study the meadow, for instance, we may do some bird-banding. We also teach people how to collect statistics and make management decisions based on those statistics." The Center frequently invites experts outside the regular workshop staff to give presentations to the alumni course participants.

For educators interested in translating the Audubon Ecology Workshop experience into practical techniques for working with school classes and youth groups, Ted Gilman, Co-ordinator of the Center, offers an accredited week-long course at Fairfield University once each summer. In addition, one of the regular week-long workshop sessions is devoted exclusively to the training of New York City school teachers.

The Workshop attracts all kinds of people and all age groups. "People here come from all walks of life," said Carter. "In one workshop you

may find housewives, a subway worker, a retired engineer, as well as an amateur or a professional naturalist." While the 30 or so participants begin the session as total strangers, "by the end of the week they're wanting to know when they're going to have a reunion," said Carter.

Since Schaeffer joined the staff two years ago, the Workshop and the Center have moved into a host of new activities and new approach to ecological education. The summer workshops will eventually be incorporated as part of a year-long Audubon Ecology Institute Program which will concentrate heavily upon urban educational strategies during the winter months.

In the meantime, Schaeffer, Assistant Director Jean Porter, and Co-ordinator Ted Gilman have redesigned much of the Workshop Program to strengthen its ecological base and to increase Center staff participation. Porter has already organized and conducted, with the help of Center staff, an Institute Workshop for the Elementary School Science Teachers' Association as well as a weekend workshop for the members of the Environmental Education Advisory Council of New York. Additional workshops are being designed by Schaeffer and Porter to include such subjects as Seasons at the Institute, Urban Environmental Education, Beginning Photography, Educational Audio-Visual Production, as well as a special Youth Leaders Workshop to be coordinated by Environmental Education Specialist, Kathy McGlaufflin.

The new direction of the workshop is only one indication of a growing movement within the National Audubon Society to take on contemporary ecological problems by tailoring their programs to the needs and realities of a technological society. While never explicitly articulated by the group, it is clear that the Society believes that most of the environmental problems that plague us today -- water

pollution, depletion of irreplaceable resources, and invasion of wildlife habitats, for example -- are due to a general lack of knowledge about and interaction with the natural world.

Since he first became involved in the Audubon Society in 1972, Schaeffer has been at the forefront of this movement. Originally a computer systems designer in New York city, Schaeffer's first management job in the Society was to head the South San Francisco Bay Wildlife Sanctuary. Schaeffer continues to take leading responsibility in developing urban strategies for the National Audubon Society. He serves on the steering committee of the Society's Citizen's Mobilization Campaign and as a board member of the Environmental Education Advisory Council to the New York City public schools.

"Because we're so close to New York, we have a special opportunity to bridge the gap between the natural world and the built world," said Schaeffer. "Bringing city kids into the country doesn't work because they're out of context. They go back to New York and still have no idea how the total system of air, water, food, and sewage work in a city. Our approach is to go into the city and make kids aware of the built environment and show them how they can control and change it. We're trying to enhance the use of city parks by school kids in addition to promoting the protection and development of national urban parks."

The urban education program is only one of the Center's activities. The Center also runs school programs for local children, a year-round, federally-approved bird-banding station operated by trained volunteers, a teachers' education program, and regularly scheduled guided nature walks and natural history presentations.

To complement their existing interpretive building, the

By Lois Kelley, Director,
James L. Goodwin Conservation Center

Forest fires

First lookout tower built in 1912 atop Mrs. Lawson's cottage

Connecticut's first fire lookout tower was built atop Mrs. Dedie Lawson's cottage in Union in 1912. Mrs. Lawson suffered from asthma. To relieve her suffering, she repaired seasonally to her cottage on Mount Ochepetuck. And thus it was that her infirmity enabled her to become Connecticut's first fire tower observer.

Once Upon A Time

Looking back from this distance in time, it might at first seem strange that forest fires, or wildfires, as they are more frequently called today, did not demand action far earlier in our history. After all, by 1912, Connecticut had been chartered for 250 years.

But our attitudes now are not what our ancestors' were. The colonists found almost nothing but forest here -- too much forest. The forest hid wild animals and perhaps dangerous Indians. The forest got in the way of plowing and planting. Some of the trees were useful to

build with, to make cradles and coffins, water pipes and organs. But many of the trees just had to be got rid of. There were trees to waste! Oftentimes fire was the tool by which the homesteader cleared his land of unwanted forest.

However, by 1900 nearly two-thirds of the state's three million acres had been cleared for agricultural and industrial uses. Most of the woodland that remained had been cut over at least once, providing timber, ~~Del~~wood, and charcoal. It represented a rapidly-diminishing resource, and there was reason for concern. On the forest floor, the slash of unused tops, along with other wastes from harvest and from nature, offered material with high fire-hazard potential.

The ethic of forest management, and of protection from unwarranted destruction, was about to be born -- a child of scarcity and of need.

The Beginning

The first legislation establishing standards to help prevent fires was passed in 1905. It set up a state-wide system of fire wardens, laws regarding kindling of fires, fines for non-observance, procedures for prosecution, and rules for collecting damages. This legislation was acted upon promptly, and by 1907 there were 17 town fire wardens in Connecticut; by 1908, 124.

Fire Patrolmen

Town wardens were empowered to establish fire patrols during seasons of drought, and to "summon any male resident between the ages of 18 and 50 years to assist in extinguishing fires."

It was determined that a fine could be levied against any person so summoned, and who is physically able, who refuses or neglects to assist, or to allow the use of horses, wagons, or other material required."

These were strong powers, indeed -- indicative of the reversal of attitude. The value of forests was recognized; they

must not be heedlessly destroyed.

Town selectmen were authorized to fix the amount which would be paid to laborers at fires, with this admonition: "As the work of fighting forest fires is difficult, it is recommended that the selectmen decide to pay all assistants for this work at the rate of twenty cents per hour."

Individuals commissioned to patrol sections of roadway considered hazard areas were likely to include nearby farmers, postmen on their rounds, even bus drivers. The first lookout method, then, was by roadside patrol -- sometimes on foot, sometimes ahorse, sometimes while going about other business. How providential it must have seemed when one of these patrolmen happened to be in the right place at the right time to take action!

The First Step Up

Here and there low platforms, about tree top height, had been built by private woodland owners and put to use for local lookout purposes. These paved the way for the fire tower, as we know it.

And Then The Big One

In 1911, with the fire prevention movement well under way, inter-town cooperation and provisions for federal assistance were written into law at state and national levels. The law provided that the State Forest Fire Warden could establish and equip fire lookout stations.

Two years later four towers were in operation, and others were on the drawing boards. From the beginning, the pattern was cooperative, varying to suit individual conditions of ownership and geography and adapting to fill special needs and to take advantage of available resources.

And Thus to Mrs. Lawson

As we have seen, some lookout stations were built and

maintained on private property, often by private funds. The arrangement with Mrs. Lawson was repeated, with variations, in numerous places. A doctor constructed a small platform on top of his summer home in Norfolk. In the Bristol area, an agreement was made with a Mrs. Bryce, on South Mountain, to keep watch for fires in the valley below. Sunset Hill in Hampton and Fort Hill in Groton were other semi-private lookout sites.

But Look at the View!

At a private tower in Groton, the view of Long Island Sound was so interesting that the owner accepted visitors. They paid five cents for the privilege and must have often distracted the official observer from fire spotting concerns.

At Travelers Tower in Hartford, where the insurance company offered its observation deck, along with the services of an observer, visitors were also welcomed, and the outlook along the Connecticut River valley was considered well worth the 25 cents charged.

Forest Protective Associations

In some places, owners of large tracts of land joined forces in Forest Protective Associations. Assessing themselves four to ten cents an acre, they financed both the maintenance of patrols and the building of towers. There were several such groups, protecting more than 50,000 acres of Connecticut's woodlands. The state contributed four cents per acre toward the cost. It was stated that "the permanency of the protection is recognized. . . as of fundamental importance, the aim being to secure a continuous yield of forest products on the lands protected."

"A" for Effort

At first, when towers were few and widespread, only a person with experience and intimate knowledge of the countryside could determine the location of a fire with any hope of accuracy. One can imagine the observer, looking out across

the undulations of Connecticut scenery: "There's smoke? Where? Well, looks like it might be just beyond Old Man MacDonald's farm -- or is it over the next hill?" A quick crank on the phone to summon the operator. A hurried search for the town fire warden. The observer's best estimate of the location of the fire and the roads by which it might be reached. How frustratingly inaccurate and slow it must often have seemed!

At Last A System!

But things were getting organized, and in the '30s, with the advent of the depression and the Civilian Conservation Corps, the pace picked up. Manpower was available to build new towers and to replace old wooden towers with steel.

By 1933 the entire state was protected by an interlocking system, and by 1940, nineteen towers, the state's maximum number, were in place.

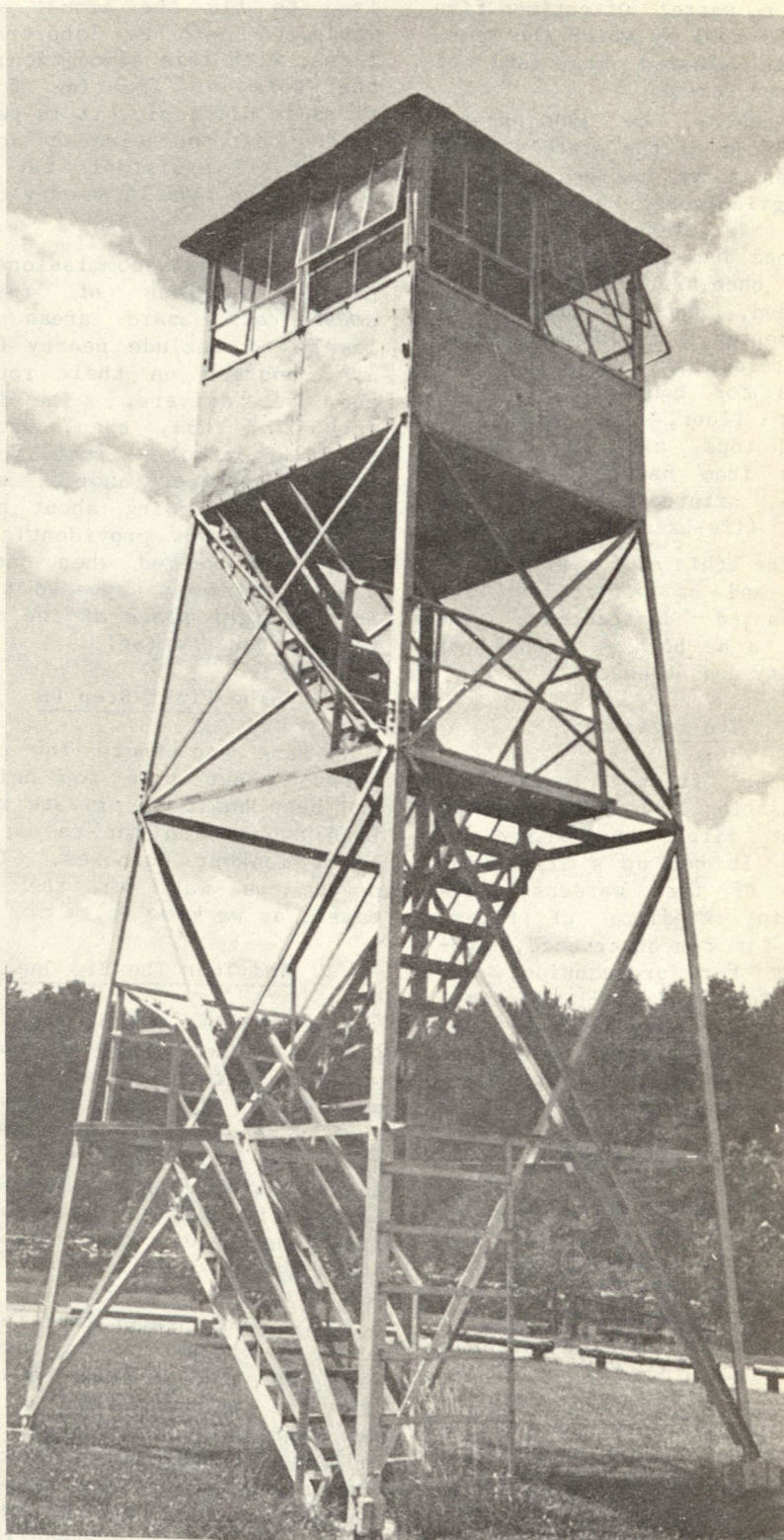
Now a "smoke" could be pinpointed from at least two towers. And, with two viewing angles to triangulate the location, accuracy was achieved.

Prevention had come a long way since the first tower in 1912. A yearly Fire Warden's Directory was published listing names, places, and phone numbers. It included summaries of fire-incidence statistics and issued special warnings.

The Not-So-Helpful Hand of New England Weather

The first such warning had been issued in 1914-1915, soon after the program started. It alerted observers to the heightened hazard due to the chestnut blight which was rapidly killing the most prevalent tree in Connecticut forests, the American Chestnut.

There were other years when the weather created worrisome conditions too. One such was 1930. Lack of snow cover the preceding winter left the ground exceedingly dry in the spring. As a result, fires were sudden and frequent and



Old fire tower, taken from Soapstone Mountain in Somers, can be seen today at James L. Goodwin Forest Conservation Center in Hampton.

"were continuous from April 28 to May 7."

The 1938 hurricane, which devastated forests in the eastern part of the state, created incendiary conditions, as did an ice storm five years later in western Connecticut. These concerns accelerated the push to improve protective services, and the U.S. Forest Service assisted with materials and training programs. With emergency funds provided at this time, the installation of two-way radios was begun -- a process which was finally completed in 1955.

Dry conditions in the spring of 1941, when there had been a cumulative deficit of nearly 12 inches of rainfall, led to such hazardous conditions that the woods were closed by the governor. Despite this, there was an increase in the number of fires. But, as the State Forester was able to boast, because of better response time, there were fewer acres burned.

War time worry

Weather abnormalities and their effect on the flammability of the forest floor will always provide special periodic problems, but weather was not the only worry of the fire tower observer. During World War II, the Warden's Directory carried warnings regarding the possibility of blazes caused by incendiary bombs, although, as it turned out, no fire was ever attributed to this cause.

The End

In Connecticut, forest fire lookout towers had a 59-year history -- less than one man's lifespan. In that brief period, they developed a tradition carrying with it many feelings of romance and adventure. Which is not surprising. The observer's lonely job, often in remote places, thrust skyward into the infinitely variable elements of New England weather, in touch with others of the fire-fighting team only by the thin thread of phone or radio -- it has caught the imagination of

those of us who live sedentary, protected lives, often unchallenging and filled with boredom.

The Record

During those 59 years, the statewide area burned by wild-fires was brought down from 50,000 acres in 1910 to less than 1,500 acres by 1970. In 1910 the average fire burned 50 acres; by 1970 it was spotted and put out before it had burned 2.5 acres.

Postscript

Like any other story, the drama of the fire tower was not played on an empty stage. The years with which we are concerned, 1912 to 1970, were explosive ones in many ways, and during those years the towers merely filled a transitional gap.

The "old days" have given way at nearly supersonic rates. Long-range communication has gone from semaphore and Morse code to radio and now to satellite and computer; transportation styles have gone from horse-and-buggy to Model-A to today's jet planes and sophisticated fire trucks. The fire tower observer has been superseded by a spotter in a plane, flying on high fire danger days in a predetermined pattern high over the State's woodlands.

What was suitable (and possible) in 1910 can no longer be considered efficient. But we mourn the loss of the old tradition. ■

At one time or another there were towers located in: Beacon Falls, Burlington/ Cornwall (Mohawk Mountain), East Haddam, Glastonbury, Groton, Guilford, Hampton (Sunset Hill), Hartford (Traveler's Tower), Killingworth, Meriden, Mystic (Stewart Hill), New London, Norfolk, Norwich, Oxford, Pomfret, Redding, Roxbury, Simsbury (Pennwood), Somers, Sterling, Storrs, Union (Mount Ochepetuck), Washington (Mount Tom), and West Hartland (Tunxis). ■

Sixteen interesting facts about forest fire towers in Connecticut

*Earliest: Union (Mount Ochepetuck), 1912

*Highest towers (75'): East Haddam, Norwich, Pomfret

*Highest observation platforms on other structures: University of Connecticut water tank, Storrs (110'); Travelers Tower, Hartford (360')

*Highest elevation: Mohawk Mountain in Cornwall (1680')

*Most extended view: Somers (35' tower, 1061' elevation) with view to Vermont, New Hampshire, New York, Massachusetts, and in Connecticut to Hartford and Meriden

*Outlook over most open farmland: Roxbury (62' tower, 1100' elevation)

*Earliest steel tower: Guilford, 1927 (47' tower, 765' elevation)

*Best view of Long Island Sound: Groton (40' tower; 220' elevation)

*Still in use: Mohawk Mountain

*Lowest structure (30'): Norfolk (1610' elevation); Union (1286' elevation)

*Built by CCC: Glastonbury (Meshomasic); East Haddam (Cockaponsett)

*On private property by cooperative arrangement: Union, Groton, Travelers Tower, South Mountain, Pennwood, Norfolk

*Most towers in use at one time: 19

*A 35' steel tower weighed 4200 pounds

*Although we usually visualize fire tower observers as male, nearly half of Connecticut's observers were women. In 1958, two women were listed as Honorary Wardens. Our only remaining tower is "manned" by a woman. ■

By Julie Eckhardt,
Student Intern, Trinity College

Forest fires

Today aerial observers cruise at 2500 feet on high danger days

Sitting in the back seat of a Cessna-Skyhawk II, a single engine plane chartered from Chester Airport for the afternoon, I anxiously await commands. "Okay, doors shut and seatbelts fastened?" asks Harris Gruber, today's forest fire patrol pilot. I recheck my seat belt. It is tightly fastened.

Pointing the nose down the runway of Hartford's Brainard Airport, Gruber accelerates. We are off. Off, at 1300 hours, on a routine aerial check for forest fires in Connecticut.

March, April, and May are active months for the Bureau of Forestry at Connecticut's Department of Environmental Protection. Strong winds and the bare branches left by winter contribute to the high fire danger of springtime. Because of a lack of protective leaf cover, the hot sun, equal to that of mid-August, dries and heats the fine fuel that covers the woodland floor. These



conditions result in the easily ignitable state of the spring forest.

As we leave Hartford behind and fly over the Connecticut River, Ariane Roedel, the Bureau of Forestry's aerial observer, informs me that because of the wet weather and lower spring temperatures, the early part of the 1982 fire season has been less severe than in past years. The danger of forest fires depends on a combination of temperature, relative humidity, and the velocity of the wind. Calculating these factors, using a table provided by the U.S. Forest Service, Bureau of Forestry staff members determine the likelihood of forest fires every morning. On days of "high" to "extreme" fire danger, Roedel goes on aerial fire patrol.

Once we attain a cruising altitude of 2,500 feet, the visibility is at least twenty miles. A forest fire's exact location and the extent of the area it covers is difficult to pinpoint from the ground. Patrolling the forests from the air facilitates fire detection, while the ability to view a fire

from above simplifies the task of leading the fire fighters directly to the blaze. Communications with the firemen are established through the Department of Environmental Protection's network of dispatch offices, located throughout the State.

Just ten minutes after takeoff, we approach the mouth of the Connecticut River. According to Roedel, we are following the usual aerial route for forest patrolling. Once we reach the shoreline, we head east and follow a flight plan that takes us around the perimeter of the State, insuring adequate protection for all areas.

For the first couple of hours, this day proves relatively calm. We spot a few small smokes, but all fires are under control by the time we fly over them to investigate. Then, at 1545, flying over New Haven, we spot smoke rising from the Bristol area. Pilot Gruber accelerates to 120 knots and heads north. We are over the wildfire in minutes.

A fire has erupted at the edge of a forest near an open

field in Bristol. As we descend and circle the area for a better view, Roedel is on the shortwave radio reporting the fire to the dispatcher at the DEP's only fire tower, atop Mohawk Mountain. The Bristol Fire Department is on the scene when we arrive, but with two and one-half acres already ablaze, it appears the fire will be difficult to control and requires DEP assistance. Roedel alerts Mohawk Tower to the situation and State fire crews are sent to the scene.

Once we know the fire fighters are on their way, we leave the area. We have been circling the fire for ten minutes, which is the maximum time allowed by the patrol schedule. This control has been set so that the plane does not remain too long in one area and can continue state-wide coverage.

Leaving Bristol, we head toward Litchfield and peer westward across the State. No fires. After a thorough canvassing of the State, we head back to Hartford, satisfied that all is peaceful in Connecticut's forests.

Elms

It appears that,
despite Dutch
elm disease,
they'll be around

By G. Winston Carter

Illustrations by Pamela Carter

My earliest recollection of the beautiful American elm goes back to my early childhood when I lived on Pleasant Street in a small northern New Hampshire town. The reason for the street's name was self-evident. Two long rows of stately elms, with their upper branches drooping like fountains, lined the street forming a cathedral-like archway. This charming sight made a lasting impression that has not faded with the years. Today, all this has changed due to the Dutch elm disease.

This raises the question of the current status of the elms in Connecticut. What kinds of elms do we have? Are all species equally susceptible to the Dutch elm disease or are some more vulnerable than others? Finally, what does the future hold for this graceful street tree, the American elm?

All elms have many characteristics in common, although there are differences which will be discussed. They usually have leaves that are asymmetrical (lopsided). The

margin of the leaves is usually doubly toothed and the leaf surface is more or less rough or hairy. The buds and bark are quite similar in all species, and the same holds true for the flowers and fruit.

I would like to think in terms of the six different species of elm that can be found growing naturally in Connecticut without cultivation. These are the following: American elm (Ulmus americana); slippery elm (Ulmus rubra); English elm (Ulmus procera); winged elm (Ulmus alata); Wych elm (Ulmus glabra) and Siberian elm (Ulmus pumila).

The best known of our elms is the American elm which, in the past, has played such a dominant role as a street tree in so many of our New England towns and villages and as a ceremonial tree through our history. This species takes several forms, but the most common and familiar is the vase-shaped appearance which is also described as being fountain-like. This refers to

the manner in which the numerous larger upper branches extend outward rather dramatically from the main trunk. Although we commonly think of the American elm only as a street tree, its natural environment is in a rather moist environment. It grows well on flood plains near rivers and streams.

This species has deep-furrowed bark separated by broad top ridges, as opposed to some of the other elms which have shallow-furrowed bark. Its leaves are variable. They may be smooth or sandpaperly above, hairless or hairy beneath. The twigs are slender and usually smooth; however, the younger ones may be slightly or densely downy. The winter buds are smooth or minutely hairy with scales that are reddish brown with dark edges. The bud is cocked somewhat to one side, giving it the appearance of a "dunce cap." The flowers are formed in small dense clusters which open in the spring. Its seeds also are in dense clusters and are wing-like with a centrally located seed. Each seed is somewhat hairy.

The wood of the American elm, like that of the other types of elm, is very difficult to split. However, this quality is valuable for certain uses. It is used for heavy flooring, furniture, and paneling and for crates and boxes because it holds screws better than almost any other kind of wood. The seeds are eaten by gamebirds such as the ruffed grouse and rodents like mice and squirrels. Deer and rabbits browse on the buds and twigs.

The slippery elm (Ulmus rubra) is the other native elm found in this area. The other elms have been introduced and escaped from cultivation. This species is found growing naturally in a similar environment to that of the American elm, in lowland areas and along streams and rivers.

Slippery elm is not as tall as American elm and not as graceful as an ornamental

because its short branches are more horizontal and they lack the drooping effect usually associated with American elm. Although it is a small tree, it has larger leaves than the American elm, and they are rougher. This roughness is present regardless of which way the leaf is rubbed. The American elm leaf is only rough in one direction, when roughness is present. Slippery elm bark has shallow furrows compared with the deeper furrows of American elm, and its inner bark is mucilagenous. It contains a nutritious slippery substance used in cough drops which accounts for its common name. The Latin species name "rubra" refers to the winter buds with their rust-colored hairs.

The wood of the slippery elm is considered inferior to the American elm but is sometimes used for furniture, paneling, boxes, and crates. The Indians used its bark for canoe shells if paper-birch was not available. The seeds of this species are of minor value to wildlife. Deer and rabbits occasionally browse on the young twigs.

The tall, stately English elm (Ulmus procera) is a native of western and southern Europe and England. It was introduced here during colonial days and eventually was planted in many cities, especially in the northwestern United States. As an escape, it is found in moist sites along roadsides and field borders.

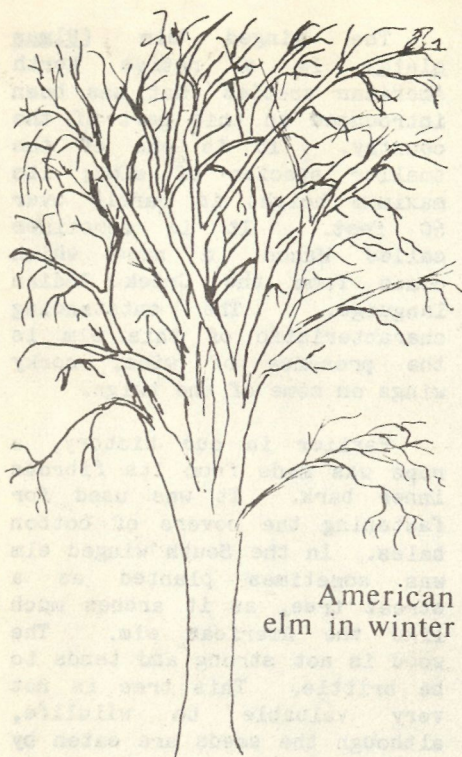
The English elm is like an oak in weight and character. The branches are usually at right angles to the upright trunk. It is one of the elms that sometimes has corky wings on its twigs. It can be distinguished from the winged elm (Ulmus alata) by its uniform dark-colored, hairy winter buds. Winged elm has winter buds less than 3/16th of an inch long that are hairless, or nearly so, with dark-bordered scales. The leaves of the winged elm have a smooth upper surface while those of the English elm are somewhat sandpaperly above.

The winged elm (Ulmus alata) is a native North American species that has been introduced to this part of the country. It is one of the smaller species of elms; its maximum height is rarely over 60 feet. It is sometimes called Wahoo, a name which comes from the Creek Indian language. The outstanding characteristic of this elm is the presence of wide, corky wings on some of the twigs.

Earlier in our history, a rope was made from its fibrous inner bark. It was used for fastening the covers of cotton bales. In the South winged elm was sometimes planted as a street tree, as it arches much like the American elm. The wood is not strong and tends to be brittle. This tree is not very valuable to wildlife, although the seeds are eaten by some animals. It reaches its greatest size in rich, moist loamy soil and is found as an understory tree in a deciduous forest.

Wych elm, or Scot elm, (Ulmus glabra) is another introduced species which is similar to the English elm and comes from northern Britain. It sometimes spreads into the wild from plantings. The trunk and branches of this rather tall tree remain smooth for many years. This species does not spread by suckers as do many of the other elms. It produces a very large fruit about one inch broad. The seeds sprout easily but they must land on moist soil during the early months of the summer. Its strong wood is considered exceptionally good for boat-building timbers.

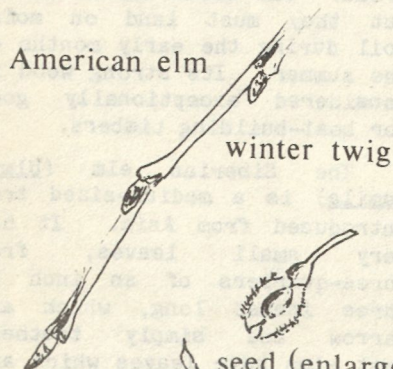
The Siberian elm (Ulmus pumila) is a medium-sized tree introduced from Asia. It has very small leaves, from three-quarters of an inch to three inches long, which are narrow and simply toothed. Most elms have leaves which are doubly toothed. This species is one of the fastest growing trees in the United States. It increases about an inch in diameter every year and about three inches in height. Its chief defect is the brittleness of the branches and the fact



American elm in winter

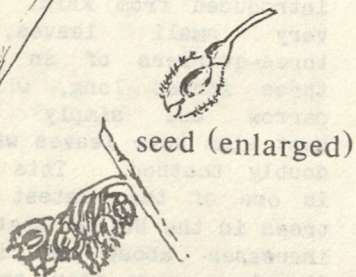


leaf of American elm

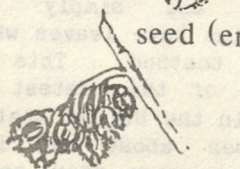


American elm

winter twig



seed (enlarged)



seed cluster

that it is short-lived. In this country it has been used in shelter belts and as a street tree.

All species of elm that have been studied in detail show variation from high to low susceptibility to Dutch elm disease but Siberian elm is the most resistant species of those included here.

Between 1926 and 1933 the elms in America were dealt a serious blow. It is believed that shipments of English elm heavily infected with European bark beetles (Scolytus multistriatus) entered this country to be used in veneer mills. The beetles were carrying a species of fungus now known as Ceratocystis ulmi. This fungus is the cause of Dutch elm disease. The origin of this fungus is still unknown, but an East Asian source is suspected because Asiatic species of elm generally resist infection. This is probably because of the long association these elms have had with this particular fungus.

The name, Dutch elm disease, is a misnomer. This refers to the fact that a great deal of research was done on this disease in the Netherlands and not due to the fact that it originated there.

The fungus as it now appears in the United States is carried by two different kinds of bark beetles, the original, smaller European bark beetle (Scolytus multistriatus) and Hylurgopinus rufipes, an elm bark beetle native to the United States.

The presence of beetles on elms can be established if large amounts of rust-colored excrement (frass) has accumulated in the crotches of a tree. There will also be "shotgun" holes present, which will indicate the openings through which the larvae have emerged from the bark. If the bark is removed, centipede-like engravings may be seen. These are the broad galleries of the larvae.

Efforts to save the elms have been moving along on several fronts in spite of the fact that in 1980 it was reported that only 40 percent of an estimated 77 million elms in urban areas remain. The elm is still considered an important street tree for some municipal plantings because of its many desirable characteristics. It has a great deal of esthetic appeal and is resistant to pollutants, drought, and de-icing salt, and it can be easily transplanted.

The outlook for preserving shade tree elms has been helped greatly by sanitation methods, by the development of new systemic fungicides and insecticides administered by injection and of bark beetle pheromones, special attractants that influence the behavior of these beetles. These techniques may give more protection than formerly was considered possible.

The best strategy appears to be one that uses all these control methods to supplement one another. However, even this approach only decreases the probability of infection or death, and a great deal of care and expense is required.

It appears that the American elm and other susceptible species of elm will persist in spite of the continued presence of the Dutch elm disease. This is due to the continuing research on better controls, the persistent ability of the elms to reproduce themselves in the wild, the temporary escape of susceptible trees, and the gradual development of resistant trees through cross-breeding of different species of elm. ■

A publication of interest that was used in the writing of this article is: The Dutch Elm Disease, Perspectives after 60 Years. Edited by W.A. Sinclair and R.J. Campana, Cornell University Agricultural Experiment Station. 1978

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CAM NEWS

Improving Connecticut's coastal embayments

During the current session of the Connecticut General Assembly, members of the DEP's Coastal Area Management staff will be working with interested legislators in an attempt to establish a statewide program to address the problems of degraded coastal coves and embayments. This effort had its beginnings back in 1980, when the Legislature passed An Act to Study Pollution and Siltation in Coastal Waters (Special Act 80-45). In doing so, the General Assembly recognized growing public concern regarding the environmental conditions of Connecticut's coastal ponds, coves, and embayments.

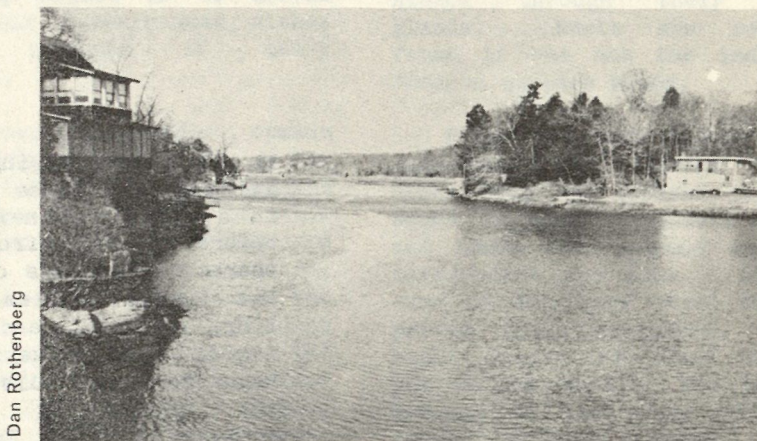
In response to these concerns, the DEP's Office of Planning & Coordination/Coastal Management, in part through a grant from the federal Office of Coastal Zone Management, commissioned a highly technical statewide survey of embayments in order to study the types of problems found there. The results of this examination are currently being analyzed as a first step in the process of determining an appropriate course of action.

Coastal embayments are sheltered environments. They are semi-enclosed bodies of water that have relatively small openings onto the Sound

or a river. Connecticut's coves vary in depth; the basins tend to average about six feet deep, but they can range to over 20 feet deep in the principal tidal rivers.

Fringed by tidal wetlands and flats, embayments are a highly productive resource. In the eastern part of the State, in particular, coves often contain submerged flats of eelgrass which increase marine productivity by trapping and stabilizing sediments and

farmlands or, more frequently, from residential and commercial developments where trees and shrubs have been cut down to make room for buildings. When the vegetation covering the land is removed, loose soil will be washed by rainwater into nearby streams and rivers and then carried down into the coves. In large river systems, such as the Connecticut River, the silts that are finally deposited in a coastal embayment such as Chester Cove may occasionally come from as far



Dan Rothenberg

A view of the Farm River from the Sound, with East Haven on the left and Branford on the right. A tidal fluctuation of about three feet in the upper estuary helps to flush out the surrounding marshes.

transferring essential nutrients from these sediments to the water column. Sedimentation, or the ongoing "siltation" of coves and embayments, is often what makes them such fertile resources; however, coves are more susceptible to pollution than nearshore waters since the sediments found there are mixing with relatively low volumes of water with limited circulation.

Most of the sediments that end up in the coves come from upland locations such as plowed

away as Vermont or Canada. Sometimes the sediments are washed into coves directly from Long Island Sound. Little Harbor in Guilford, for example, receives sediments carried in by the waves and tides of the Sound.

Because of the natural rate of sedimentation in our coves, the ecological health of an embayment is largely dependent upon there being an unrestricted flow of water in and out of the cove. If this natural flushing process

By Penni Sharp

Nature Notes:

Amphibians lead damp "double lives"

It was a late spring. Fog and mist in those hollows in a way I had never seen before. And frogs, of course. Thousands of them, and twenty species, trilling, gurgling, and grunting in as many keys. The beautiful keen silver piping of spring peepers arousing as the last ice leaves the ponds -- if you have heard that after a long winter alone, you will never forget it.

The Dance of the Frogs Loren Eiseley

Around the middle of March, when winter finally shows signs of loosening its grip, out of the wet and swampy places come the nocturnal notes of spring peepers. The voices of these amphibian choristers are regarded by many as a sure sign of spring.

The peepers are not the only members of this interesting class of animals (*Amphibia*) to begin activity as the thaw persists and snow storms give

way to warm spring rains. Salamanders are on the move, and wood frogs, frogs, and toads begin to stir.

Amphibians are animals with backbones that have moist skins which lack any covering such as scales, feathers, or fur. They have at least one pair of legs and have toes without claws. They are cold-blooded animals dependent upon outside sources for regulating their body temperatures.

Amphibians lay eggs either directly in water or in moist terrestrial places. The eggs are encased in a gelatinous layer. Amphibians pass from the egg to one or more larval stages to adult. Usually the larval stage is spent in aquatic habitats and at this stage the amphibian breathes by means of gills. Thus the name amphibian, derived from the Greek *amphi*, meaning "double," and *bio*, meaning "life," is quite apt.

Salamanders are interesting animals that are probably less

Illustrations: Penni Sharp

familiar to many than the frogs and toads. They have long bodies and tails and relatively short legs. They all have moist skins that lose water readily, and thus they must remain near water or damp places.

One of the common salamanders in Connecticut is the handsome spotted salamander (Ambystoma maculatum). These amphibians take part in mass migrations beginning at the onset of warm spring rains, usually from mid-March into April. During this period, they move by night into specific breeding ponds to which they return year after year. The breeding period is of short duration, lasting only a few weeks. But during this time, at known sites, large numbers of salamanders may be observed.

The spotted salamander belongs to a group known as mole salamanders, so named because they spend much of their lives underground. Adults of this particular species have a striking coloration. They have black backs and round spots of yellow or orange arranged in irregular rows down their sides from the head to the tip of the tail. The underside is slate gray. They range in length from six to eight inches, the largest on record being nine inches.

As mentioned, these salamanders are known to make mass migrations to breeding areas. Once at their natal ponds, they perform a courtship ritual, swimming about and rubbing

noses. Females deposit the large gelatinous egg masses in the water. The egg mass is clear or milky and can be either cylindrical or round in shape. Anywhere from a dozen to over 200 eggs can be present in a single mass. The incubation period lasts from 31 to 54 days depending upon the temperature of the water.

The young larvae measure about one-half inch upon hatching and are yellowish-green with dark spots. Their legs are not fully developed and they are totally aquatic, breathing by means of gills. They remain as larvae for two or three months, at which point they transform and become terrestrial.

At times other than the breeding season, spotted salamanders are seen rarely. They may venture from hiding places on rainy nights or be driven from their subterranean niches during periods of heavy rainfall.

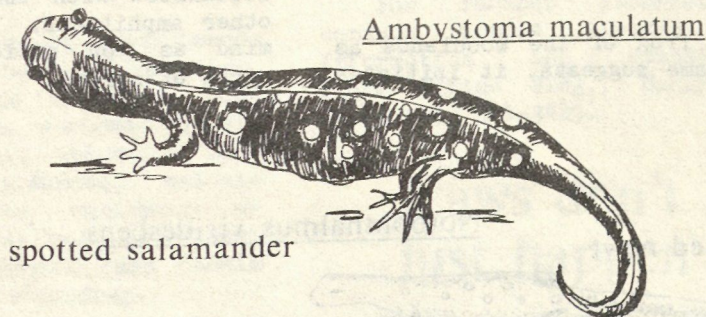
Another salamander common to Connecticut is the red-spotted newt (Notophthalmus viridescens). Adults of this species are aquatic. They are normally olive green in color, sprinkled with red spots. The red spots are present through all of their life stages. The red-spotted newt has a rather complex life history. During the spring breeding season, over 200 eggs are laid, each fastened to an aquatic plant. The eggs hatch in two to three weeks, and the larvae emerge. The larvae grow and develop,

eventually transforming to a land-dwelling stage that is known as the red eft. Efts are bright orange-red with red spots. Their skin becomes thick and somewhat rough and their tails are rounded. In some instances, the eft stage is passed by and the larvae transform immediately to the aquatic adult. Usually, however, the eft stage occurs and persists for one or two years. Efts dwell in moist woodlands. For the final phase, or adult stage, they return to ponds. Aquatic dwellers once more, their tails become flattened and rudder-like and they are well-adapted for swimming.

Newts are carnivorous and feed on a variety of pond dwellers including insects, leeches, small mollusks, and worms. Few predators are interested in newts because they secrete an irritating substance through their skin glands. Newts are readily found if one has the inclination to explore ponds.

Frogs and toads differ from salamanders in several ways. Other than the obvious differences in body structure, frogs and toads have voices whereas salamanders are mute. In the case of the very vocal spring peeper (Hyla crucifer), these small frogs are often heard, yet seldom seen. The peeper belongs to the group of wood frogs of the genus Hyla, derived from a Greek word meaning "woods." The epithet, crucifer, refers to a cross; this is an appropriate appellation as these frogs have an irregular dark cross pattern on their backs. Like other members of the genus, peepers have relatively long limbs. Their toes are equipped with small suction disks, thus they are well-adapted for arboreal life.

A favorite habitat for peepers is a second growth woodlot near a vernal pond. Other members of this genus have the ability to change their coloration quite dramatically to match their surroundings. The spring peeper, however, varies only in shades of tan to brownish olive. The



Ambystoma maculatum

spotted salamander

males have a throat pouch or vocal sac that inflates to look like a balloon under the chin. Males form their choral groups in early spring and begin their calling prior to the arrival of the females. Spring peepers are the first of our frogs to be heard, and, in fact, their tadpoles are swimming before some frogs have emerged from hibernation.

Females lay from 800 to 1300 eggs which are attached to some form of support under water. The eggs hatch somewhere between five and 15 days, and usually during July the tadpoles transform into peepers about one-half inch in size. It takes three or four years for a peeper to reach maturity. Peepers feed chiefly on insects which they catch with lightning swift movements of their tongues. They, in turn, are prey to many animals, including salamanders, fish, birds, and some small mammals.



Hyla crucifer

Spring peeper



Wood frog: Leonard Lee Rue III

Another springtime chorister is the wood frog (Rana sylvestris). The voice of the wood frog is deeper and throatier than that of the peeper and does not carry nearly as far. It resembles the quacking of a duck. Wood frogs belong to the genus of true frogs. Members of this genus generally have slender bodies and long legs. The hind feet are webbed. They are good swimmers and are capable of jumping long distances.

Wood frogs are handsome frogs which usually measure approximately two to two-and-one-half inches. A black face mask, always present, is the most distinguishable field mark. The frog can be quite variable in color, ranging from pink to coppery brown to almost black.

A frog of the woodlands as its name suggests, it initiates

its breeding ritual slightly later than the spring peeper. Also selecting woodland ponds, wood frogs usually mate in early April, the female laying as many as 3,000 eggs in masses or spheres under water. Tadpoles emerge in four to 24 days. By mid-summer, the tadpoles metamorphose into small frogs which take up to four years to reach adulthood. Wood frogs feed on a variety of small animals found on the forest floor. Like the spring peeper, wood frogs have a number of enemies throughout their life history.

These animals represent a small number of the many interesting species that belong to the order Amphibia. Springtime is a good time to become acquainted with these and many other amphibians. Keep them in mind as you notice the many signs of spring.

red spotted newt

Notophthalmus viridescens





By Leslie Bieber,
Citizens' Participation Coordinator

For Your Information

Land use course offered

The Natural Resources Center of the Department of Environmental Protection, together with the Connecticut Cooperative Extension Service, is conducting a practical course on natural resources especially designed for local land-use officials.

The course, which will be held at the White Memorial Foundation in Litchfield, will provide basic information to town commissioners concerning the natural resources of the community and will demonstrate how local decisions should reflect the capacities of those resources. It will also cover the legal authority of the commission as well as the basic planning process.

All members of town boards and commissions — planning, zoning, inland wetlands, conservation, and economic development — should attend. Town councilmen, aldermen, selectmen, and town employees or officials involved in local decisions affecting land should also consider attending.

A variety of topics of interest to the land-use planner will be discussed during

the sessions. These include: natural resource systems, review of proposals, avoiding detrimental impacts to natural resources, and the legal requirements of decision-making. Two field trips will help participants apply the classroom learning to site analysis.

The course fee is \$25 per person for the entire series, or \$100 per town. The town fee covers all town officials and employees who choose to attend the course. The fee also covers a packet of course materials.

All sessions, except the Saturday field trips, will be held on Tuesday evenings, March 15 to April 12, from 7:30 p.m. to 10 p.m. The Saturday field trips will run from 9 a.m. to 12 noon.

For further information, contact Leslie Bieber, DEP Information and Education, State Office Bldg., Hartford, CT 06106; 566-3489.

Laws don't just happen

In recent months there has been a considerable amount of grumbling about Connecticut's

new Inspection and Maintenance program to reduce auto emissions. This kind of lament is common when any law which goes into effect causes inconvenience or expense to citizens. I heard the same type of complaints when the Bottle Bill became effective and when hunting and fishing license fees were increased. Along with the complaints, there is always the complaint, "I never even knew about this law!"

Believe it or not, it doesn't take much effort to keep yourself informed about bills like these. During a legislative session, most of the newspapers in the State carry a list of bills to be heard in the next few days. If you see a bill on a subject you are either actively opposed to or enthusiastically in favor of, don't just sit there! Let your legislators know how you feel.

The December 1982 "Citizens' Bulletin" included an excellent article on public hearings, so I won't go into detail here. Suffice it to say that you can present your comments in person or in writing. You may not think that your thoughts can influence legislation, but they can. If you have friends or relatives that feel the same way you do, get them to put in their two cents worth. I have seen many bills

changed or scrapped in the General Assembly in the face of public pressure.

A final note. Make sure you find out as much as possible about a proposed bill before you make your comments. An informed constituent is a more persuasive one. There are many environmental groups who can help you decypher legal language or tell you what they think a certain bill's effect will be. You can also call this office at 566-5599 for information. Laws don't create themselves; you have a voice, use it.

Environment Committee 1983-1984

SENATORS:

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5 Talmadge Street
Derby, CT 06418
734-3315; 734-3671

George L. Gunther
890 Judson Place
Stratford, CT 06497
378-8572

Howard Owens
488 Brooklawn Avenue
Bridgeport, CT 06604
334-4153; 579-0316

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566-3491; 623-6507

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Susan P. Barrett
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Fairfield, CT 06430
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Julie Belaga
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John Mordasky
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566-6106; 684-7267

Mary Mushinsky
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Antonina B. Parker
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Glastonbury, CT 06033
566-6023; 633-9314

John Tiffany
Sterling City Road
Lyme, CT 06371
566-6023; 434-2888

CLERK: Mary Finnegan
566-5083

New DEP publications

1. In November, the Natural Resources Center released its "Atlas of Public Water Supply Sources and Drainage

Basins." This 11" x 14" soft cover book contains the 115 U.S.G.S. topographic maps that cover Connecticut, reduced to a scale of 1:50,000. Plotted on the maps are the surface reservoirs and groundwater wells used for public water supply as well as the watershed boundaries of all surface water bodies and watercourses throughout the state.

2. The ninth in the series of 10 Water Resources Inventories, "Lower Connecticut River Basin," Connecticut Water Resources Bulletin #31, is now available from DEP.

The Lower Connecticut Report is the product of studies conducted by the U.S. Geological Survey in cooperation with the Connecticut Department of Environmental Protection to determine the quantity and quality of surface and groundwater available in the State. The report contains the finding of these studies and includes several large maps showing the areal distribution, texture, and thickness of stratified drift aquifers associated with the tributaries and the main stem of the Connecticut River. The report covers the Connecticut River watershed from Bolton, Portland, and Newington down to Long Island Sound from Guilford to Old Lyme.

This report is designed to be useful to planners, public officials, water utility personnel, consulting hydrologists, well drillers, and others concerned with the development, management, use, conservation, and protection of water resources.

Both the Topographic Atlas and the Connecticut River Report are \$10 each. To order, send \$10 and \$.75 sales tax for each book plus \$1.00 handling charge per order to: Publication Sales, Department of Environmental Protection, Natural Resources Center, 165 Capitol Avenue, Room 555, Hartford, CT 06106. Make checks or money orders payable to the "Department of Environmental Protection."

Rain

Summary of precipitation in Connecticut for 1982

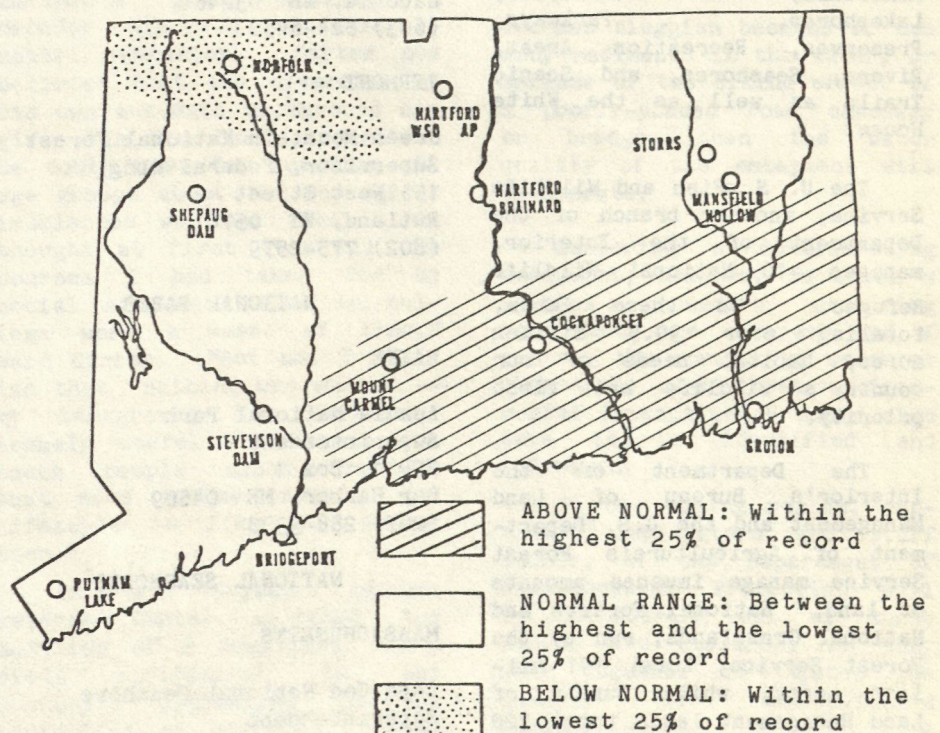
January 1, 1982 -
December 31, 1982

Precipitation for the year 1982 was quite variable in distribution, ranging from a low of 40.03 inches at Brainard Field in Hartford to a high of 56.29 inches at Cockaponset Ranger Station in Haddam. Cockaponset Ranger Station, Groton, and Mount Carmel in Hamden were in the above normal range for the year, while Norfolk 2SW in Norfolk was in the below normal range. The remaining eight stations were in the normal range.

Primarily responsible for this distribution was rainfall that occurred during the storm of June 4-7. Central, south-central, and southeastern Connecticut received in excess of 10 inches of rain during this storm while the northwest and southwest received less.

Taken from "Water Resources Conditions in Connecticut," December 1982 issue, prepared by the U.S. Geological Survey in cooperation with the Connecticut Department of Environmental Protection. ■

Station	Cumulative Precipitation 1982	1982 Departure From Cumulative Median
Bridgeport	42.61	1.19
Cockaponset	56.29	6.40
Groton	52.64	2.74
Hartford WSO AP	48.12	4.18
Hartford Brainard	42.78	-2.75
Mansfield Hollow Dam	50.70	5.41
Mount Carmel	54.17	5.61
Norfolk	44.39	-8.78
Putnam Lake	49.47	-1.07
Shepaug Dam	50.65	2.25
Stevenson Dam	54.84	5.14
Storrs	52.37	4.81



Wildlife Week

From page 2

such as the Bureau of Land Management, the Forest Service, the Department of Defense, and the General Services Administration will be sold to the highest bidders.

The federal government has always sold "surplus" land. Many state, city, and local governments and many non-profit groups have, in the past, been able to purchase surplus public lands for parks and recreation areas, at lower than market prices. Now anyone who wants a piece of this land will have to outbid the wealthiest bidders, including individuals, industries, and organizations.

Who takes care of public lands

The National Park Service, an agency of the Department of the Interior, is custodian of areas of outstanding beauty and of scientific, archaeological, and historical significance. Totalling about 74 million acres, our National Park system includes National Parks and Monuments, Historic Sites and Parks, Battlefields and Memorials, Cemeteries, Lakeshores, Parkways, Preserves, Recreation Areas, Rivers, Seashores, and Scenic Trails as well as the White House.

The U. S. Fish and Wildlife Service, another branch of the Department of the Interior, manages 410 National Wildlife Refuges. On these lands, totaling over 90.5 million acres, habitat needs of our country's wildlife are first priority.

The Department of the Interior's Bureau of Land Management and the U.S. Department of Agriculture's Forest Service manage immense amounts of land. National Forests and National Grasslands, run by the Forest Service, total 191 million acres, while Bureau of Land Management lands total 320

million acres or about 43 percent of all federal public lands. These two agencies manage the lands under their care to accommodate a wide variety of uses, including grazing, timber harvesting, mining, oil and gas extraction, preservation of natural ecosystems, and outdoor recreation including hiking, fishing, and hunting.

Other agencies having jurisdiction over public lands include the Army Corps of Engineers, the Bureau of Indian Affairs, the Department of Defense, and the Tennessee Valley Authority.

Public lands in New England

There are about a dozen and a half National Wildlife Refuges in the New England States, including one in Connecticut. In the New England region there are also the following national parks, forests, and seashores (their mailing addresses and phone numbers are shown):

NATIONAL FORESTS

NEW HAMPSHIRE

White Mountain National Forest
Supervisor, Federal Bldg.
719 Main Street, Box 638
Laconia, NH 03246
(603) 524-6450

VERMONT

Green Mountain National Forest
Supervisor, Federal Bldg.
151 West Street
Rutland, VT 05701
(802) 775-2579

NATIONAL PARKS

MAINE

Acadia National Park
Superintendent
RFD 1, Box 1
Bar Harbor, ME 04609
(207) 288-3338

NATIONAL SEASHORES

MASSACHUSETTS

Cape Cod National Seashore
Superintendent

South Wellfleet, MA 02663
(617) 349-3785

Federal lands in Connecticut

Connecticut is the 48th largest state and, with an area of a little over 3.2 million acres, we're considerably smaller than many of the major federal land holdings. (Interestingly, the Department of the Navy holds more total acres than the State of Connecticut -- nearly 3.6 million.) Nevertheless, you can find some federal lands in the State that are open for recreational use.

Salt Meadow

National Wildlife Refuge

Connecticut's one National Wildlife Refuge comprises 185 acres of riverine salt marsh and upland areas in Westbrook. It's open to the public from sunrise to sunset, for hiking, wildlife appreciation, nature photography. There are about three miles of hiking trails and parking for 16 cars. No hunting, fishing, or crabbing.

Among the area's interesting natural features are examples of glaciated and striated rocks and about 100 acres of mature, 300 to 500 year old trees, including species of apple "you probably won't see elsewhere."

There are two currently unused houses on the property, one of which, the Murdock farm house, dates from the 1700s. During the summer of 1983 it's expected that federal youth conservation workers will work on improving the refuge's trails, as they have in summers in the past. Staff members from the U.S. Fish and Wildlife Service give environmental tours to larger school groups, land trusts, etc., by arrangement.

The area was donated to the Fish and Wildlife Service in 1971 by Esther Lape, who was a professor at Swarthmore and was involved with an array of organizations including the

League of Nations, the World Health Organization, and the United Nations.

To get to Salt Meadow National Wildlife Refuge, take I95 to exit 64. Head toward Long Island Sound on Horse Hill Road. Take a left onto Old Clinton Road. Go about three miles; parking lot is on the right.

Army Corps of Engineers Properties

There are about a dozen Army Corps of Engineers dams and flood control projects in Connecticut. Some of these are operated as parts of State parks, others as separate recreation areas. Hours are generally from sunup to 8 p.m.

Nearly 1,000 acres surrounding the Thomaston Dam are open. Fifty-four miles of trails are available for snowmobiling and motor cycle or trail bike use. There's also hiking, including hikes along old Route 8 which runs through the center of the reservoir. There's wildlife viewing and a recreation area has picnic tables and fireplaces. Radio-controlled airplane hobbyists also use the area for their meets.

To get to the Thomaston Dam, take Connecticut Route 222 north from Thomaston Center.

Eight acres at the Northfield Dam, which is two miles west of Thomaston on Connecticut Route 254, are open for picknicking and swimming.

The Black Rock Dam's 20 acres, two miles west of Thomaston on Connecticut Route 109, are open for fishing and the area is stocked with trout.

Also stocked for fishing and open for swimming is the Hop Brook Dam property. This 21 acre area is three miles north of Naugatuck on Connecticut Route 63.

From Winsted, Colebrook River Lake, on the West Branch of the Farmington River, is six miles north on Route 8. It offers fishing, boating, and a boat launching ramp.

From Plymouth, take Connecticut Route 262 to Graystone Road to Hancock Brook Lake. It offers warm water fishing.

Write to the Department of Army/Corps of Engineers, New England Division, Naugatuck River Basin Office, Thomaston Dam, 331 Hill Road, Thomaston, CT 06787 or call the Army Corps at Thomaston Dam at 283-5540 for a brochure on recreation at these areas. ■

Trailside Botanist

From page 5

Center has plans to build a new wing which will include displays ranging from a puppet theatre for young children to an environmental computer center. "We want to keep pace with the technology the kids use in the schools," Schaeffer said of the computers. The programs used on the terminals will be designed to teach ecological concepts in a game format. For example, Schaeffer hopes to design a program where a kid has to go out into the field and make observations or collect data before continuing with the next step in the program.

As it turns out, Win Carter's own career is a personal reflection of Audubon's move towards a broader approach to environmental education. Carter now believes that the diversity of his own academic background has given him the best preparation he could have for teaching all age groups about the ecological imbalances we face today. "I thought at first that all the courses I had taken for my social sciences major in college were a waste of time," said Carter. "But now I realize that nothing was wasted -- my background has been extremely useful when trying to teach people about problems that have become part of our lifestyle -- like air pollution."

As a 15-year Audubon veteran Carter welcomes the addition of a commitment to a clean environment to the Society's dedication to the protection of wildlife. When

Phil Schaeffer took his staff to New York to give them an insider's look at the urban environment, Carter went along, and says the trip was an opportunity for him to view the only environment with which many of his workshop students are familiar.

Although Carter is undeniably a naturalist at heart, he illustrates the transition made by the National Audubon Society's Audubon Center in Greenwich, from an organization of biologists and wildlife enthusiasts to a dynamic coalition of ecology experts interested in saving our environment as well as studying it.

Most "Bulletin" readers know Carter as an excellent plant-life specialist, and for most professionals in his field this would be quite enough. But not for Win Carter. He and the other staff members at the Audubon Center take the "holistic" approach, as Carter terms it, and try to combine an interest in wildlife and plant life with a concern for the quality of life. "The closer you get to the edge of a precipice," remarked Carter on the current abuse of the environment, "the more you've got to push for change." ■

Embayments

From page 15

becomes sluggish because of too many sediments in the water, or because of the diking effect of a poorly-placed road causeway or bridge, then the water quality of the embayment will degenerate.

Restoring a deteriorating embayment, however, is often a complex procedure requiring more than one approach. And, of course, the corrective measures themselves might have environmental impacts which would also have to be identified and addressed.

In the coming months, concerned legislators and staff members of the Department of Environmental Protection will be considering all of these issues and questions as they work together to improve the quality of Connecticut's coastal waters. ■

* About one-third of the U.S. is federal public land.

* The Department of Interior manages about 70 percent of our public lands.

* Yellowstone, established in 1872, was the first national park.

* The U.S. Forest Service manages the 19 national grasslands.

* Theodore Roosevelt reserved 230 million acres of public land.

* There are national wildlife refuges in 49 states.

* The Bureau of Land Management supervises approximately 40 percent of our public lands.

Facts about federal lands

* The Department of Interior was established in 1849.

* The U.S. Forest Service was established in 1905.

* The National Park Service was established in 1916.

* The Bureau of Land Management was established in 1946.

* National parks log over 325 million visits a year.

* Bureau of Land Management lands host 80 million recreational visits a year.

* Thirty-nine states have national forests.

* National parks cover an area larger than the State of Arizona.

* National parks are found in 24 states.

* National forests cover an area the size of Colorado, Nevada, and Montana.

* Military bases are considered public lands.

* The Washington Monument is on public land.

* The Gettysburg Battlefield is a public land.

* Public lands once included over 1.8 billion acres.

DEP Citizens' Bulletin

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